UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,176	08/30/2004	Rashid Iqbal	04-09	5175

32583 7590 10/30/2007

KELLOGG BROWN & ROOT LLC
ATTN: Christian Heausler
4100 Clinton Drive
HOUSTON, TX 77020

EXAMINER	
BOYER, RANDY	
ART UNIT	**PAPER NUMBER**
1797	

MAIL DATE	DELIVERY MODE
10/30/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/711,176	IQBAL ET AL.	
	Examiner	Art Unit	
	Randy Boyer	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17 and 27-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17 and 27-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Examiner acknowledges response filed 23 August 2007 containing amendments to the claim and remarks.

2. Claims 1-17 and 27-37 are pending.

3. Examiner acknowledges the amendment made to claim 31 is sufficient to overcome the previous objection.

4. The previous rejections of claims 1-17 and 27-37 under 35 U.S.C. 103(a) are maintained. The rejections follow.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-8, 10-16, and 27-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Audeh (US 5192421) in view of Inomata (JP 2002-302680).

9. With respect to claim 1, Audeh discloses a process for upgrading crude oil from a subterranean reservoir of heavy oil or bitumen, comprising: (a) solvent deasphalting at least a portion of the heavy oil or bitumen to form an asphaltene fraction and a deasphalted oil (DAO) fraction essentially free of asphaltenes having a reduced metals content (see Audeh, column 9, lines 15-38); (b) supplying a feed comprising the DAO fraction to an upgrading means (see Audeh, column 5, lines 42-63); and (c) recovering an upgraded product (see Audeh, column 5, lines 55-59).

Audeh does not disclose wherein the upgrading means involves depositing a portion of the metals from the DAO fraction onto an FCC catalyst, and recovering a hydrocarbon effluent having a reduced metal content from an FCC unit.

However, Audeh discloses that his process can be used to produce a FCC feed (see Audeh, column 4, lines 32-35), and that the upgrading means may be catalytic cracking, hydrotreating, or hydrocracking (see Audeh, column 5, lines 59-61). In addition, Inomata discloses a process for the solvent extraction and hydrorefining of heavy oil (see Inomata (English translation), Abstract). In the first stage of Inomata's process, asphalthenic components are selectively removed from a heavy oil feed by solvent extraction (see Inomata (English translation) at page 6, lines 20-24). Next, the deasphalted oil is recovered and subjected to hydrorefining, which Inomata describes as encompassing both hydrocracking and hydrodemtallization (see Inomata (English translation) at page 7, lines 21-29). Elaborating on the process of hydrodemetallization, Inamato explains that metallic compounds in the hydrocarbon are hydrolyzed at high temperatures and pressures in the presence of hydrogen wherein the elemental metal contaminants are precipitated onto the catalyst to obtain a refined oil having a low metal concentration (see Inomata (English translation) at page 7, lines 32-34). Inomata further discloses that two are more catalyst types can be used together in the hydrorefining stage, such that it is possible to carry out hydrocracking and hydrodemetallization in the same unit (see Inomata (English translation) at page 7, lines 44-48).

Therefore, the person having ordinary skill in the art of heavy oil upgrading would have been motivated to incorporate the use of Inomata's hydrorefining process as the "upgrading means" of Audeh's process in order to deposit a portion of the metals from

the DAO fraction onto an FCC catalyst, and recover a hydrocarbon effluent having a reduced metal content from an FCC unit.

Finally, the person having ordinary skill in the art of heavy oil upgrading would have had a reasonable expectation of success in incorporating the use of Inomata's hydrorefining process as the upgrading means of Audeh's process because (1) both Audeh and Inomata are directed to the solvent deasphalting of heavy oil, and (2) Audeh specifically contemplates the use of hydrocracking and hydrotreating as the "upgrading means" in a process for upgrading crude oils.

10. With respect to claim 2, Audeh discloses converting the asphaltenes to steam for use in producing heavy oil or bitumen from the reservoir for feed to the solvent deasphalting (see Audeh, column 5, lines 64-68; and column 6, lines 1-3).

11. With respect to claim 3, Audeh discloses supplying the asphaltene fraction from the solvent deasphalting to the asphaltenes conversion (see Audeh, column 5, lines 35-37 and 64-66; and drawing).

12. With respect to claim 4, Examiner notes that neither Audeh nor Inomata expressly disclose removing metallized FCC catalyst from the FCC unit. However, Inomata explains that the hydrorefining process is a "representative refining process," and that metal contaminants contained within the DAO precipitate out onto the catalysts used during hydrodemetallization. Thus, the person having ordinary skill in the art of heavy oil upgrading and FCC processes would recognize that the catalysts used in the hydrocracking / hydrodemetallization process of Inomata would eventually have to be removed and replaced with fresh catalyst. Moreover, the use of fluidized units for

hydrocracking and hydrodemetallization (and which Audeh specifically discloses (see Audeh, column 4, lines 26-35)) are commonly known in the art to provide for the removal and/or regeneration of spent catalyst particles used therein (see e.g., J. Reese et al., *Industrial Applications of Three-Phase Fluidization Systems*, in FLUIDIZATION, SOLIDS HANDLING, AND PROCESSING, Noyes Publications (Westwood, New Jersey 1998) at pages 615-616, and Fig. 6 (showing used catalyst outlet port)).

13. With respect to claim 5, Audeh discloses a process for upgrading crude oil from a subterranean reservoir of heavy oil or bitumen, comprising: (a) converting asphaltenes to steam for use in producing heavy oil or bitumen from a reservoir (see Audeh, column 5, lines 64-68; and column 6, lines 1-3); (b) solvent deasphalting at least a portion of the heavy oil or bitumen to form an asphaltene fraction and a deasphalted oil (DAO) fraction essentially free of asphaltenes having a reduced metals content (see Audeh, column 9, lines 15-38); (c) supplying the asphaltenes fraction from the solvent deasphalting to the asphaltenes conversion (see Audeh, column 5, lines 35-37 and 64-66; and drawing); (d) supplying a feed comprising the DAO fraction to an upgrading means (see Audeh, column 5, lines 42-63); (e) recovering an upgraded product (see Audeh, column 5, lines 55-59).

Audeh does not disclose wherein the upgrading means involves depositing a portion of the metals from the DAO fraction onto an FCC catalyst, recovering a hydrocarbon effluent having a reduced metal content from an FCC unit, or removing metallized FCC catalyst from the FCC unit.

However, Audeh discloses that his process can be used to produce a FCC feed (see Audeh, column 4, lines 32-35), and that the upgrading means may be catalytic cracking, hydrotreating, or hydrocracking (see Audeh, column 5, lines 59-61). In addition, Inomata discloses a process for the solvent extraction and hydrorefining of heavy oil (see Inomata (English translation), Abstract). In the first stage of Inomata's process, asphalthenic components are selectively removed from a heavy oil feed by solvent extraction (see Inomata (English translation) at page 6, lines 20-24). Next, the deasphalted oil is recovered and subjected to hydrorefining, which Inomata describes as encompassing both hydrocracking and hydrodemtallization (see Inomata (English translation) at page 7, lines 21-29). Elaborating on the process of hydrodemetallization, Inamato explains that metallic compounds in the hydrocarbon are hydrolyzed at high temperatures and pressures in the presence of hydrogen wherein the elemental metal contaminants are precipitated onto the catalyst to obtain a refined oil having a low metal concentration (see Inomata (English translation) at page 7, lines 32-34). Inomata further discloses that two are more catalyst types can be used together in the hydrorefining stage, such that it is possible to carry out hydrocracking and hydrodemetallization in the same unit (see Inomata (English translation) at page 7, lines 44-48). Examiner notes that neither Audeh nor Inomata expressly disclose removing metallized FCC catalyst from the FCC unit. However, Inomata explains that the hydrorefining process is a "representative refining process," and that metal contaminants contained within the DAO precipitate out onto the catalysts used during hydrodemetallization. Thus, the person having ordinary skill in the art of heavy oil

upgrading and FCC processes would recognize that the catalysts used in the hydrocracking / hydrodemetallization process of Inomata would eventually have to be removed and replaced with fresh catalyst. Moreover, the use of fluidized units for hydrocracking and hydrodemetallization (and which Audeh specifically discloses (see Audeh, column 4, lines 26-35)) are commonly known in the art to provide for the removal and/or regeneration of spent catalyst particles used therein (see e.g., J. Reese et al., *Industrial Applications of Three-Phase Fluidization Systems*, in FLUIDIZATION, SOLIDS HANDLING, AND PROCESSING, Noyes Publications (Westwood, New Jersey 1998) at pages 615-616, and Fig. 6 (showing used catalyst outlet port)).

Therefore, the person having ordinary skill in the art of heavy oil upgrading would have been motivated to incorporate the use of Inomata's hydrorefining process as the "upgrading means" of Audeh's process in order to (1) deposit a portion of the metals from the DAO fraction onto an FCC catalyst, (2) recover a hydrocarbon effluent having a reduced metal content from an FCC unit, and (3) remove metallized FCC catalyst from the FCC unit.

Finally, the person having ordinary skill in the art of heavy oil upgrading would have had a reasonable expectation of success in incorporating the use of Inomata's hydrorefining process as the upgrading means of Audeh's process because (1) both Audeh and Inomata are directed to the solvent deasphalting of heavy oil, and (2) Audeh specifically contemplates the use of hydrocracking and hydrotreating as the "upgrading means" in a process for upgrading crude oils.

14. With respect to claims 6-8, Audeh discloses wherein the asphalt fraction from a solvent deasphalting process is burned to produce steam which is then injected into the ground to produce more heavy oil (see Audeh, column 5, lines 64-68; and column 6, line 1).

15. With respect to claim 10, Inomata discloses wherein the solvent deasphalting provides high lift (see Inomata (English translation) at page 12, Table 1).

16. With respect to claim 11, Audeh discloses feeding a portion of the asphaltenes fraction to a delayed coker unit to produce coker liquids and coke (see Audeh, column 10, lines 51-54).

17. With respect to claim 12, Audeh discloses wherein lower boiling hydrocarbon fractions are introduced to an upgrading means with the DAO fraction (see Audeh, column 5, lines 42-61).

18. With respect to claim 13, Inomata discloses wherein the hydrorefining unit is operated at a conversion from 30 to 65 percent by volume of the feed to the hydrorefining unit (see Inomata (English translation) at page 14, lines 42-46; and page 15, lines 5-25).

19. With respect to claim 14, Inomata discloses wherein operating conditions in the hydrorefining unit are adjusted to control proportions of individual components obtained in the hydrorefining effluent (see Inomata (English translation) at Table 6 and accompanying text).

20. With respect to claim 15, Inomata discloses hydrotreating the hydrocarbon effluent from the hydrorefining unit to produce a low sulfur hydrocarbon effluent (see Inomata (English translation) at page 7, lines 31-32).

21. With respect to claim 16, Inomata discloses wherein the hydrotreating is effected at a moderate pressure of from 3.5 to 10 MPa (see Inomata (English translation) at page 13, line 11).

22. With respect to claim 27, Audeh discloses an apparatus for upgrading crude oil from a subterranean reservoir of heavy oil or bitumen, comprising: (a) means for converting asphaltenes to steam (50) for use in producing heavy oil or bitumen from a reservoir; (b) means for solvent deasphalting (20) at least a portion of the produced heavy oil or bitumen containing metals to form an asphaltene fraction and a deasphalted oil (DAO) fraction essentially free of asphaltenes having a reduced metals content; (c) means for supplying the asphaltene fraction from the solvent deasphalting to the asphaltenes conversion (26); (d) means for supplying a feed comprising the DAO fraction to an upgrading means (42); (e) means for recovering an upgraded hydrocarbon effluent from an upgrading means (60).

Audeh does not disclose wherein the upgrading means comprises a reaction zone for depositing metals from the DAO fraction onto an FCC catalyst, means for recovering a hydrocarbon effluent having a reduced metal content from an FCC unit, or means for removing metallized FCC catalyst from the FCC unit.

However, Audeh discloses that his process can be used to produce a FCC feed (see Audeh, column 4, lines 32-35), and that the upgrading means may be catalytic

cracking, hydrotreating, or hydrocracking (see Audeh, column 5, lines 59-61). In addition, Inomata discloses a process for the solvent extraction and hydrorefining of heavy oil (see Inomata (English translation), Abstract). In the first stage of Inomata's process, asphalthenic components are selectively removed from a heavy oil feed by solvent extraction (see Inomata (English translation) at page 6, lines 20-24). Next, the deasphalted oil is recovered and subjected to hydrorefining, which Inomata describes as encompassing both hydrocracking and hydrodemtallization (see Inomata (English translation) at page 7, lines 21-29). Elaborating on the process of hydrodemetallization, Inamato explains that metallic compounds in the hydrocarbon are hydrolyzed at high temperatures and pressures in the presence of hydrogen wherein the elemental metal contaminants are precipitated onto the catalyst to obtain a refined oil having a low metal concentration (see Inomata (English translation) at page 7, lines 32-34). Inomata further discloses that two are more catalyst types can be used together in the hydrorefining stage, such that it is possible to carry out hydrocracking and hydrodemetallization in the same unit (see Inomata (English translation) at page 7, lines 44-48). Examiner notes that neither Audeh nor Inomata expressly disclose removing metallized FCC catalyst from the FCC unit. However, Inomata explains that the hydrorefining process is a "representative refining process," and that metal contaminants contained within the DAO precipitate out onto the catalysts used during hydrodemetallization. Thus, the person having ordinary skill in the art of heavy oil upgrading and FCC processes would recognize that the catalysts used in the hydrocracking / hydrodemetallization process of Inomata would eventually have to be

removed and replaced with fresh catalyst. Moreover, the use of fluidized units for hydrocracking and hydrodemetallization (and which Audeh specifically discloses (see Audeh, column 4, lines 26-35)) are commonly known in the art to provide for the removal and/or regeneration of spent catalyst particles used therein (see e.g., J. Reese et al., *Industrial Applications of Three-Phase Fluidization Systems*, in FLUIDIZATION, SOLIDS HANDLING, AND PROCESSING, Noyes Publications (Westwood, New Jersey 1998) at pages 615-616, and Fig. 6 (showing used catalyst outlet port)).

Therefore, the person having ordinary skill in the art of heavy oil upgrading would have been motivated to incorporate the use of Inomata's hydrorefining process as the "upgrading means" of Audeh's process in order to provide (1) a reaction zone for depositing a portion of the metals from the DAO fraction onto an FCC catalyst, (2) means for recovering a hydrocarbon effluent having a reduced metal content from an FCC unit, and (3) means for removing metallized FCC catalyst from the FCC unit.

Finally, the person having ordinary skill in the art of heavy oil upgrading would have had a reasonable expectation of success in incorporating the use of Inomata's hydrorefining means as the upgrading means of Audeh's apparatus because (1) both Audeh and Inomata are directed to the solvent deasphalting of heavy oil, and (2) Audeh specifically contemplates the use of hydrocracking and hydrotreating as the "upgrading means" in an apparatus for upgrading crude oils.

23. With respect to claims 28-30, Audeh discloses converting the asphaltenes to steam for use in producing heavy oil or bitumen from the reservoir for feed to the solvent deasphalting (see Audeh, column 5, lines 64-68; and column 6, lines 1-3).

24. With respect to claim 31, Inomata discloses wherein the solvent deasphalting means provides for high lift (see Inomata (English translation) at page 12, Table 1).

25. With respect to claim 32, Audeh discloses feeding a portion of the asphaltenes fraction to a delayed coker unit to produce coker liquids and coke (see Audeh, column 10, lines 51-54).

26. With respect to claim 33, Inomata discloses wherein the hydrorefining unit is operated at a conversion from 30 to 65 percent by volume of the feed to the hydrorefining unit (see Inomata (English translation) at page 14, lines 42-46; and page 15, lines 5-25).

27. With respect to claim 34, Inomata discloses wherein operating conditions in the hydrorefining unit are adjusted to control proportions of individual components obtained in the hydrorefining effluent (see Inomata (English translation) at Table 6 and accompanying text).

28. With respect to claim 35, Inomata discloses hydrotreating the hydrocarbon effluent from the hydrorefining unit to produce a low sulfur hydrocarbon effluent (see Inomata (English translation) at page 7, lines 31-32).

29. With respect to claim 36, Inomata discloses wherein the hydrotreating is effected at a moderate pressure of from 3.5 to 10 MPa (see Inomata (English translation) at page 13, line 11).

30. Claims 9, 17, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Audeh (US 5192421) in view of Inomata (JP 2002-302680) and Wallace (P.S. Wallace et al., *Heavy Oil Upgrading by the Separation and Gasification of Asphaltenes*,

Gasification Technologies Conference (San Francisco 1998), *available at* http://www.gasification.org/Docs/1998_Papers/gtc9817p.pdf).

31. With respect to claim 9, Audeh discloses a process for upgrading crude oil from a subterranean reservoir of heavy oil or bitumen, comprising: (a) converting asphaltenes to steam for use in producing heavy oil or bitumen from a reservoir (see Audeh, column 5, lines 64-68; and column 6, lines 1-3); (b) solvent deasphalting at least a portion of the heavy oil or bitumen to form an asphaltene fraction and a deasphalted oil (DAO) fraction essentially free of asphaltenes having a reduced metals content (see Audeh, column 9, lines 15-38); (c) supplying the asphaltenes fraction from the solvent deasphalting to the asphaltenes conversion (see Audeh, column 5, lines 35-37 and 64-66; and drawing); (d) supplying a feed comprising the DAO fraction to an upgrading means (see Audeh, column 5, lines 42-63); (e) recovering an upgraded product (see Audeh, column 5, lines 55-59); and (f) producing heavy oil or bitumen from the reservoir for feed to the solvent deasphalting (see Audeh, column 5, lines 64-68; and column 6, lines 1-3).

Audeh does not disclose wherein the upgrading means involves depositing a portion of the metals from the DAO fraction onto an FCC catalyst, recovering a hydrocarbon effluent having a reduced metal content from an FCC unit, or removing metallized FCC catalyst from the FCC unit; or wherein the asphaltenes conversion comprises gasification of a portion of the asphaltenes fraction to provide power, steam, or fuel gas for the mining and extraction.

However, Audeh discloses that his process can be used to produce a FCC feed (see Audeh, column 4, lines 32-35), and that the upgrading means may be catalytic

cracking, hydrotreating, or hydrocracking (see Audeh, column 5, lines 59-61). In addition, Inomata discloses a process for the solvent extraction and hydrorefining of heavy oil (see Inomata (English translation), Abstract). In the first stage of Inomata's process, asphalthenic components are selectively removed from a heavy oil feed by solvent extraction (see Inomata (English translation) at page 6, lines 20-24). Next, the deasphalted oil is recovered and subjected to hydrorefining, which Inomata describes as encompassing both hydrocracking and hydrodemtallization (see Inomata (English translation) at page 7, lines 21-29). Elaborating on the process of hydrodemetallization, Inamato explains that metallic compounds in the hydrocarbon are hydrolyzed at high temperatures and pressures in the presence of hydrogen wherein the elemental metal contaminants are precipitated onto the catalyst to obtain a refined oil having a low metal concentration (see Inomata (English translation) at page 7, lines 32-34). Inomata further discloses that two are more catalyst types can be used together in the hydrorefining stage, such that it is possible to carry out hydrocracking and hydrodemetallization in the same unit (see Inomata (English translation) at page 7, lines 44-48). Examiner notes that neither Audeh nor Inomata expressly disclose removing metallized FCC catalyst from the FCC unit. However, Inomata explains that the hydrorefining process is a "representative refining process," and that metal contaminants contained within the DAO precipitate out onto the catalysts used during hydrodemetallization. Thus, the person having ordinary skill in the art of heavy oil upgrading and FCC processes would recognize that the catalysts used in the hydrocracking / hydrodemetallization process of Inomata would eventually have to be

removed and replaced with fresh catalyst. Moreover, the use of fluidized units for hydrocracking and hydrodemetallization (and which Audeh specifically discloses (see Audeh, column 4, lines 26-35)) are commonly known in the art to provide for the removal and/or regeneration of spent catalyst particles used therein (see e.g., J. Reese et al., *Industrial Applications of Three-Phase Fluidization Systems*, in FLUIDIZATION, SOLIDS HANDLING, AND PROCESSING, Noyes Publications (Westwood, New Jersey 1998) at pages 615-616, and Fig. 6 (showing used catalyst outlet port)). Finally, Wallace discloses an integrated deasphalting-gasification process whereby the asphalt fraction obtained in a deasphalting process is used as feed to an asphalt gasification process (see Wallace, pages 5-6). Wallace explains that the combined deasphalting-gasifying process can beneficially be used in oil fields to produce syngas for meeting the power requirements of the deasphalter, gasifier, and associated oil production facilities (see Wallace, pages 10-11).

Therefore, the person having ordinary skill in the art of heavy oil upgrading would have been motivated to (1) incorporate the use of Inomata's hydrorefining process as the "upgrading means" of Audeh's process in order to (a) deposit a portion of the metals from the DAO fraction onto an FCC catalyst, (b) recover a hydrocarbon effluent having a reduced metal content from an FCC unit, and (c) remove metallized FCC catalyst from the FCC unit; and (2) incorporate use of an asphalt gasifier (as taught by Wallace) in order to produce syngas for use as fuel to meet the power requirements of the mining and extraction operations.

Finally, the person having ordinary skill in the art of heavy oil upgrading would have had a reasonable expectation of success in incorporating the use of Inomata's hydrorefining process and Wallace's asphalt gasification process as additions to Audeh's process for upgrading heavy oils because (1) Audeh, Inomata, and Wallace are all directed to the solvent deasphalting of heavy oil, (2) Audeh specifically contemplates the use of hydrocracking and hydrotreating as the "upgrading means" in a process for upgrading crude oils, and (3) Wallace explicitly discloses the use of his asphalt gasification process as part of a combined deasphalting-gasification process.

32. With respect to claims 17 and 37, Wallace discloses gasifying asphaltenes recovered in the asphaltenes fraction from the solvent deasphalting to produce hydrogen for the hydrotreating (see Wallace, pages 6-7).

Response to Arguments

33. Applicant's arguments filed 23 August 2007 have been fully considered but they are not persuasive.

34. Examiner understands Applicant's principal arguments to be:

I. Neither Audeh nor Inomata disclose or suggest fluid catalytic cracking (FCC) or supplying a DAO fraction to a reaction zone of a FCC unit with FCC catalyst to deposit a portion of the metals from the DAO fraction onto the FCC catalyst.

II. Hydrorefining is not synonymous with FCC as those refining techniques are widely accepted and known in the art to be entirely different.

III. Examiner has not established a *prima facie* case of obviousness.

35. With respect to Applicant's first argument, Audeh discloses wherein a DAO fraction (22) is supplied to a distillation unit (40) from which the heaviest portion of the DAO fraction is withdrawn (via process line 42) and fed to an "upgrading means" (60) which may be a catalytic cracker (see Audeh, drawing; and column 5, lines 55-61). Moreover, Audeh *explicitly* discloses wherein the upgrading means may be a fluidized catalytic cracker (FCC) unit (see Audeh, column 4, lines 6-68 (especially lines 33-34 and 55-68)). Thus, Audeh clearly discloses supplying a DAO fraction to the reaction zone of a FCC unit.

36. With respect to Applicant's second argument, Examiner is aware of and understands the differences between hydrorefining and FCC. However, Audeh explicitly recognizes catalytic cracking (FCC) to be an equivalent of hyrdrocracking and hydrotreating for the purpose of upgrading a heavy DAO fraction (see Audeh, column 5, lines 55-61) ("The upgrading may be catalytic, e.g. catalytic cracking or hydrotreating or hydocracking, or thermal, e.g. visbreaking."). See MPEP §§ 2144.06 and 2144.07. Thus, Examiner finds Applicant's specification for use of a "FCC unit" and "FCC catalyst" to be of no patentable consequence since Audeh discloses the use of catalytic cracking, hydrocracking, and hydrotreating as alternative means for upgrading a heavy DAO fraction.

37. With respect to Applicant's third argument, see discussion *supra* at paragraphs 8-32. Examiner submits that sufficient motivation exists for one of ordinary skill in the art to have combined the references as described. Specifically, Examiner notes that Audeh is concerned with producing deasphalted oil fractions with reduced metal content

while Inomata provides a means by which to reduce the metals content of a deasphalted oil fraction by depositing (precipitating) such metals onto the surface of a catalyst used in a hydrotreating unit (which Audeh recognizes as a substitute means for FCC in the upgrading of a heavy DAO fraction).

Finally, Examiner notes that Applicant's argument that "the Examiner must *particularly* identify any suggestion, teaching or motivation from *within* the references to combine the references" is an incorrect statement of law inasmuch as the Supreme Court's verdict in *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ.2d 1385 (2007) has effectively overruled the case which Applicant cites for support of such argument.

Conclusion

38. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

39. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Randy Boyer whose telephone number is (571) 272-7113. The examiner can normally be reached Monday through Friday from 10:00 A.M. to 7:00 P.M (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola, can be reached at (571) 272-1444. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RPB

Glenn Caldarola
Supervisory Patent Examiner
Technology Center 1700